Notice of Allowability	Application No.	Applicant(s)
	10/765,399	YOSHIDA ET AL.
	Examiner	Art Unit
	Shih-wen Hsieh	2861

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *application filed on Jan 28, 2004*.

2. ☒ The allowed claim(s) is/are *1-27*.

3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☒ All b) ☐ Some* c) ☐ None of the:
      1. ☒ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 5-4-04
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

2. Claims 1-27 are allowed.

3. The following is an examiner's statement of reasons for allowance:

In regard to:

Claims 1-12:

The primary reason for the allowance of claims 1-12 is the inclusion of the limitation of wherein the second drive mechanism uses the second drive source as its drive source, has a dead zone in which a rotational force is not transmitted to the feeding means when the second drive source changes its rotation direction, and is operated in the dead zone according to a direction in which a driving force of the second drive source is generated. It is this limitation found in each of the claims, as they are claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes these claims allowable over the prior art.

Claims 13 and 14:

The primary reason for the allowance of claims 13 and 14 is the inclusion of the limitation of wherein the second drive mechanism uses as its drive source a second drive source for driving a feeding means to feed the print medium to the transport means, has a dead zone in which a rotational force is not transmitted to the feeding means when the second drive source changes its rotation direction, and is operated in the dead zone according to a direction in which a driving force of the second drive source is generated. It is this limitation found in each of the claims, as they are claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes these claims allowable over the prior art.

Claims 15-27:

The primary reason for the allowance of claims 15-27 is the inclusion of the limitation of wherein one of facing parts of a circumference of the piston shaft and a circumference of the rotating body is formed with a continuous spiral groove that crosses at one part, wherein the other of the facing parts is provided with a projection that fits in the groove so that it is movable relative to the groove, in order to convert a rotary motion in at least one direction of the rotating body into a linear reciprocal motion of the piston shaft. It is these limitations found in each of the claims, as they are claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes these claims allowable over the prior art.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Reference 6,523,929 B2, "Image forming apparatus" issued to Kan et al., 2/2003 furnished in the IDS dated May 4, 2004 teaches in their fig. 2 an arrangement very close to the instant application. In Kan et al.'s reference, three motors are used, a Line feed motor (LF motor, 305 as a first drive source) functions to drive feed roller (302), which transports the print medium passes underneath the print head to receive ink droplet discharged by the head to form images on the medium. On the other hand, LF motor also drives a pump transmission gear (509) through a LF pendulum mechanism (comprising a LF pendulum arm 310 pluses base gear 304 and planetary gear 311), when the LF motor changes its direction of rotation opposites to a direction of rotation for transporting the medium. A second drive source is the automatic sheet feeding/purge motor (AP motor 501), which drives the paper supply roller (102) sending print medium stacked in a medium cassette on an one by one basis to the feed roller (302) through an AP pendulum mechanism (comprising an AP pendulum arm 515 pluses a base gear and planetary gear 516). On the other hand, the AP motor also drives a gear (520), which in turn drives a cap cam (513) that operates a cap holder (504) and a blade holder 9508) when the AP motor changes its direction of rotation opposites to a direction of rotation for supplying medium to the feed roller (302). Carriage motor (CR motor, 204) is the third drive source.

In Kan et al.'s reference, the AP motor (501, the second driving source) corresponds to the feeding means (100 of the instant application) for feeding the print medium to the transport means. The AP motor of Kan et al. also drives the capping and wiping devices by the AP pendulum mechanism. However, the switching between feeding the medium and driving the capping and wiping devices in Kan et al. is by the changing direction of rotation of the AP motor, such that the planetary gear 516 will either assume a position 516a to drive the paper supply roller (102) or a position 516b to operate the capping and wiping devices. During the transition, Kan et al. fail to teach the dead zone as recited in the claim and this dead zone is backed up in specification page 37, line 9 to page 40 line 12. Dead zone also occurs in pumping operation in the instant application when switching from medium transport by discharge roller (301) to drive the piston pump shown in figs. 31 to 38.

As to the piston pump, the conventional piston pump shown in fig. 45 close to the instant application. In fig. 45, the piston shaft has a screw groove (7), in which protrusions of a screw cam (8) fit into the groove, cam (8) rotates in directions as shown, and piston shaft (626) reciprocates (in A1 B1 direction). The cam (8) can be treated as the rotating body of the instant application and is rotated around the axis of the piston shaft (since the cam 8 is wrapped around the shaft), and the piston shaft is kept from rotating about its own axis. However, a circumference of the rotating body (the cam 8) is not formed with a continuous spiral groove as that recited in claim 15 of the instant application.

Piston pump is widely used in ink jet printer as a device to create a negative pressure in one of its pressure chambers (generally, a piston in the cylinder divides the chamber in the cylinder into two chambers) to suck ink out of a print head through a capping device. Most of this type of pumps uses a cam to operate its piston shaft to allow the piston shaft moves inside the cylinder reciprocally. Followings are a few examples:

US 5,481,282, "Suction recovery device and ink jet recording apparatus with the device" issued to Iwata, 1/96 teaches in his figs. 2 and 24 a piston pump (53), which is driven by cam 63, refer to col. 6, lines 40-54.

US 5,639,220, "Pump with inlet and outlet simultaneously exposed to pump chamber and method of operating the same" issued to Hayakawa, 6/97 teaches a piston pump (56) in fig. 2. The driving mechanism to the pump is denoted by numeral 54, numeral (88) is a cam with cam grooves (90 and 104), cam followers (86 and 102) fit into the groove respectively. A motor (130) is used to rotate the cam (88), refer to col. 9, lines 43-58.

US 6,050,668, "Ink jet recovery pump with variable driving condition" issued to Ikado, 4/2000 teaches in his figs. 5 and 6 a piston/plunger pump (150), which is driven by a stroke gear (106) having projections that engage with a lead groove (104a) in the plunger (104), and the rotation force of the stroke gear (106) is imparted by engagement with the control gear (102), and as a result, rotational force is transmitted from the carrier motor (255, fig. 2), refer to col. 4, line 33 to col. 5, line 11.

US 6,086,183, "Recovery device of an ink jet printer" issued to Nakahara, 7/2000 teaches in his fig. 3 a piston pump (42), which is operated by a cam member (43), refer to col. 6, line 40 to col. 7, line 11.

US 6,769,763, "cylinder pump, an ink jet printing system using the cylinder pump and a photograph assembly having the printing system" issued to Kurata et al., 8/2004 teaches in their fig. 16 a pump unit (B315) having a cylinder pump (B410), which is driven by a motor (M004) through a screw rod (B460), refer to col. 15, line 15 to col. 16, line 16.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shih-wen Hsieh whose telephone number is 571-272-2256. The examiner can normally be reached on 7:30AM -5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, S D. Meier can be reached on 571-272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SHIH-WEN HSIEH
PRIMARY EXAMINER

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SWH

Jan 31, 2006

10/765,399